

REMARKS

In response to the Office Action mailed April 13, 2004, Applicants request reconsideration. No claims are added or cancelled or even amended so that claims 1-4 remain pending.

Since the issuance of the Office Action, Applicants have filed, on May 20, 2004, an Information Disclosure Statement citing one U.S. patent. An indication of consideration of that patent in the next communication is respectfully requested.

The invention, as claimed, is directed to an excitation control apparatus and an excitation control method for a synchronous machine, e.g., a generator, connected in a power system. In the apparatus and method, the output voltage and reactive current produced by synchronous machine are measured as a function of time. This information is supplied so that a reference voltage can be established as the voltage that is to be produced by the synchronous machine. The reference voltage is determined, at least in part, by the reactive current that is measured and a reference voltage at an output side of a transformer that connects synchronous machine to a power transmission system. Further, the reference voltage is based upon a phase compensation transfer function that is particularly important in the event of voltage or fluctuations in the voltage of the power system or the synchronous machine. The phase compensation transfer function enables the apparatus to recover from a fluctuation in the voltage of the power transmission system more quickly than if the transfer function were not a part of the voltage setting means in the apparatus and the corresponding method.

Claims 1-4 were rejected as obvious over Frierdich et al. (U.S. Patent No. 4,264,856, hereinafter Frierdich) in view of Mori et al. (U.S. Patent No. 5,485,075, hereinafter Mori). This rejection is respectfully traversed.

A fundamental requirement for establishing obviousness of a claim is a demonstration that all of the elements of the claim are known in the prior art. However, that requirement is, by itself, insufficient to establish obviousness. In addition to showing the presence of all of the claim elements, it is essential to show that there is motivation for the combination of the elements to produce the claimed invention. Here, both the elements and the motivation are lacking.

The Examiner essentially maintained his prior position with respect to all of the elements of the invention claimed except with regard to the reactive current detection means and the corresponding step of detecting a reactive current output from the synchronous machine. Mori was newly relied upon as supplying those elements of the claimed invention. However, even if, for the sake of argument, it is assumed that Mori supplies those elements of the claims, Frierdich still fails to stand for the propositions for which it was cited.

In re Appln. of KITAMURA et al.
Application No. 10/030,986

At pages 2 and 3 of the Official Action, the Examiner recited limitations of the independent apparatus claim 1. He identified as the voltage setting means of the claim elements 41, 43, and 45 of Frierdich. It was asserted in this recitation, without any citation of any passage of Frierdich, that these identified elements in Frierdich set the reference voltage according to “a phase compensation transfer function to quicken attenuation of an electric power fluctuation”. However, a diligence search for Frierdich fails to disclose any passage in that patent that supports the assertion that such a feature is present there. In fact, the words “transfer function” are not even used anywhere within Frierdich. Of course, verbatim recitation of the claim elements in a prior art publication is not essential to a rejection. Rather, it is sufficient if the reference describes the substance of the claim in different words. Nevertheless, no discussion in Frierdich has been located that mentions the equivalent of a phase compensation transfer function as in the voltage setting means and the voltage setting step of the independent claims 1 and 3.

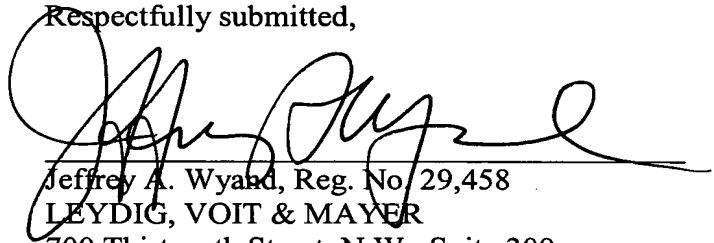
What appears to be described in Frierdich is controlling of the excitation of a synchronous machine in response to various overload conditions within a power system. To be sure, this description relates to fluctuations in voltage of a power system so that Frierdich is relevant prior art. However, the structure of the apparatus described by Frierdich and its method of operation are entirely different from the invention as defined by the presently pending claims. In Frierdich, a compensating voltage is supplied to field windings of the generator and the magnitude of the compensating voltage is directly related to the number of phases of the three phase generator that are short circuited. In this instance, “phase” relates to one leg of a multiple phase generator, not the concept of phase relating to relative shifts with respect to time of an alternating current voltage and the corresponding current that is referred to in the claims and the present patent application. These latter differences in phase account for the presence of reactive current that is referred to in the claims. Thus, the method of responding to a fluctuation in voltage in Frierdich is totally unrelated to the apparatus and corresponding method that is presently claimed.

In summary, with respect to the primary reference, Frierdich, that reference cannot stand for the proposition for which it was cited because the reference is silent with respect to the phase compensation transfer function of the claims. That phase compensation transfer function of the invention, which hastens the restoration of stable operating conditions following an electric power fluctuation, simply cannot be found in Frierdich. Thus, not even the prerequisite for establishing obviousness is present here. For that fundamental reason, the rejection cannot properly be maintained.

In addition, there is no motivation for the purported combination of references. Mori is simply too different from Frierdich to suggest to one of skill in the art a modification of Frierdich with Mori. Móri clearly does sense reactive power because Mori attempts to stabilize a power system by, in part, controlling both reactive current and reactive voltage. The objective of Mori is to avoid switching losses that occur in a self-commutated converter. This method of operation and the associated circuitry are so different from the response of Frierdich to short circuiting by applying a compensating voltage to a winding, a voltage that depends upon the number of short circuits, that one of skill in the art would find no basis for modifying Frierdich with Mori. Stated another way, the two different types of control exercised in Frierdich and Mori, relying upon different sensed quantities and responding in different ways to sensed fluctuations, does not suggest any apparatus or a method employing both features, much less the invention as defined by claims 1-4. For this addition reason, rejection of claims 1-4 should be withdrawn.

Reconsideration and favorable action on all four claims are earnestly solicited.

Respectfully submitted,



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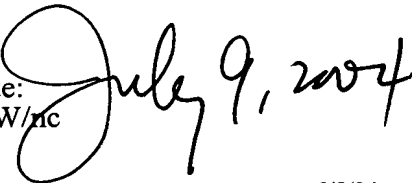
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